

## Quantitative Analyses of the Severity of Attack on Crevice Corrosion Surfaces

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The analysis of the results of crevice corrosion testing for stainless steels and other corrosion resistant metals has primarily been qualitative. Due to the localized nature of the attack, mass loss measurements must be interpreted with great care. In addition, such measurements provide very limited information regarding the spatial distribution of the damage which can be of critical importance to the effects of the corrosion on structural integrity. The application of confocal laser scanning microscopy (CLSM) to corroded surfaces allows quantitative examination. CLSM provides a quantitative topographical map with a spatial resolution on the micron scale in all three dimensions. An example of such a map from a crevice corroded sample of C-22 [1], along with a single line scan, is shown in Figure 1. The image is from one "foot" of a multiple crevice assembly. Analyses of such data allow the calculation of a number of parameters of interest, including but not limited to the volume lost, the maximum depth of attack, and the auto correlation function. The autocorrelation function provides information concerning the periodicity of surface features. Examples of the application of these analyses to quantitative evaluation of the effects of experimental parameters as well as validation of crevice corrosion models will be presented.

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[1] K. Mon, G. Gordon, R. Rebak, "Stifiling of Crevice Corrosion in Alloy 22." 12<sup>th</sup> International Conference on Environmental Degredation of Materials in Nuclear Systems-Water Reactors, Salt Lake City, UT, 8/14/05-8/18/05.

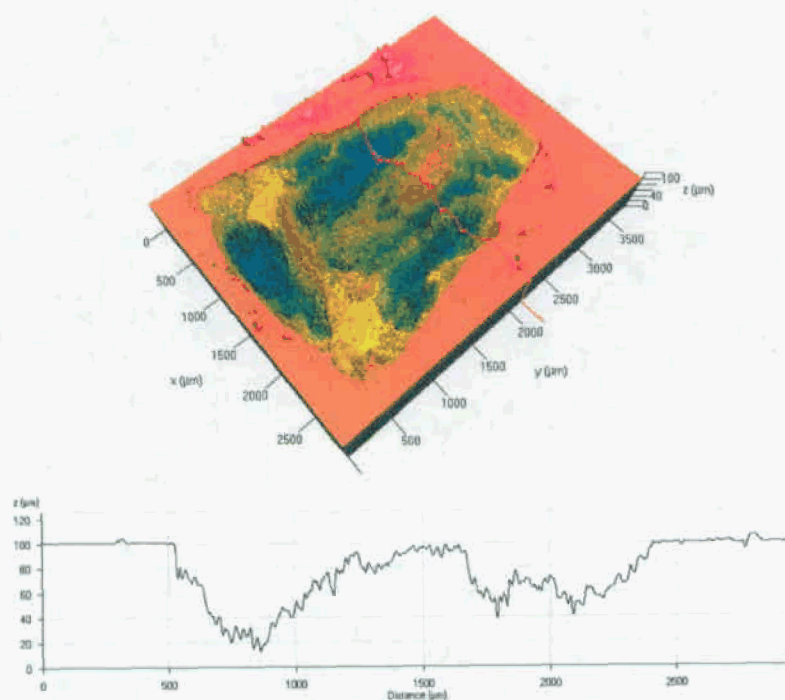


Figure 1: Topographical map of a single foot and a line scan at the position indicated from a multiple crevice assembly sample of C-22 corroded for 168 h in a 3.5m NaCl + 0.175m KNO<sub>3</sub> solution with a 100mV SSC applied potential at 100°C [1].